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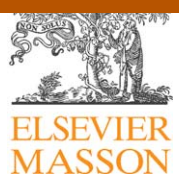

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CASE REPORT

Intra-articular osteoid osteoma of the hip misdiagnosed by MRI: An unusual cause of unexplained hip pain

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Summary Osteoid osteoma is a common benign bone tumor affecting the young adult with typical clinical and radiographic presentation in its most common locations. However, when arising in unusual intra-articular locations, diagnosis may appear confusing and lead to delayed management. We present the case of a 24-year-old man with intra-articular osteoid osteoma of the hip involving the posteroinferior quarter of the femoral head. This unusual location was at the origin of unexplained pain and delayed diagnosis made 18 months after the onset of symptoms since the initial magnetic resonance imaging (MRI) examination could not identify the lesion whereas it was detected on bone scintigraphy and thin slice CT imaging. Due to the complex location providing difficult access for radioguided techniques, an open surgical management was suggested and performed through a limited posterolateral approach with no hip dislocation, after identification of the circumflex pedicle. Following complete surgical excision of the tumor, the diagnosis could be confirmed after histopathologic analysis. No recurrence was observed.

Introduction

Osteoid osteoma is a benign osteoblastic tumor (2 to 3% of all bone tumors) described by Jaffé in 1935 [1] that occurs mostly in children [2] and young adults, affecting men twice as often as females and commonly arising in the cortico-diaphyseal or metaphyseal region of the long bones (femur, tibia) [3,4]. History of nocturnally aggravating and salicylate-responding pain is characteristic for this tumor [4]. Intra-articular location is less frequent (10%) leading to a more confused diagnosis [5,6] and produces nonspecific clinical symptoms that may mimic inflammatory mono-arthritis [7,8]. As its clinical presentation, radiographic findings of osteoid osteoma, especially on magnetic resonance imaging (MRI), are less specific in such unusual locations, which may lead to a delayed diagnosis and treatment [6,9]. When

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Figure 1 Antero-posterior radiograph of the right hip: the tumor is not visible; the presence of enostosis cannot be correlated with pain symptoms.

Figure 2 Frontal MRI of the right hip: clearly visible enostosis whereas osteoid osteoma is not detected.

required, medical treatment may appear difficult due to the critical location of the tumor or the extent of cartilage involvement [4,10]. We report on the case of a 24-year-old man with intra-articular osteoid osteoma involving the right femoral head, initially misdiagnosed with MRI and anatomically inaccessible for percutaneous or arthroscopic treatment.

Observation

A 24-year-old man, occasional sports cycling participant, presented to our institution with a one-year history of pain in his right thigh thus suggestive of cruralgia. The episodes of diurnal and nocturnal pain were unresponsive to treatment with standard analgesics. The patient's medical, surgical and trauma history was unremarkable. On physical examination of the right hip, passive and active mobilizations caused diffused mild pain radiating along the anterior aspect of the thigh. Range of motion was normal and symmetrical. The Lasegue's sign was negative and examination of the dorsolumbar spine was normal.

The first radiographic examinations (A/P and lateral hip radiographs (Fig. 1), computed tomography (CT-scan) of the dorsolumbar spine, MRI of the hip and thigh (Fig. 2)) did not reveal any anomaly except the presence of misleading benign enostosis located in the right femoral neck, which alone could not be correlated with the patient's clinical picture. The patient did not report any biological inflammatory syndrome. Various symptomatic treatments were successively carried out (anti-inflammatory medications, corticosteroids, osteopathy, homeopathy). Only anti-inflammatory drugs could partially relieve pain.

Due to the persistent pain, a Technetium-99 m bone scintigraphy was performed after six months of treatment that is 18 months after the onset of symptoms. Bone scintigraphy revealed a well-demarcated intense radiotracer uptake surrounded by less intense uptake in the right femoral head. The diagnosis of osteoid osteoma of the femoral head was thus evoked. Computed tomography (CT-scan) obtained with contiguous millimetric thin sections of the hip demonstrated a typical 7-mm-diameter intra-articular posteroinfero-medial cephalic image composed of hyperintense nidus and hypodense surrounding rim of peripheral reactive sclerotic bone thus suggestive of intra-articular osteoid osteoma of the hip (Fig. 3).

Since the location of the lesion did not provide a safe access for standard radioguided removal, surgical resection of the tumor through a minimally invasive posterolateral approach was planned. The posterior femoral circumflex vessels were identified and preserved then a T-shaped arthrotomy (designed with a trochanteric basis) was carried out after passing through the piriformis and superior gemellus muscles. Then the hip was placed in flexion, adduction and maximum internal rotation for proper visualization of the tumoral region, which was macroscopically exposed out of the acetabulum coverage area. The superficial area of tumor effraction was of bluish aspect thus facilitating its identification. An en-bloc resection with further curettage of the perilesional bone with no filling was performed then the entire excised specimen was sent to the laboratory for anatomopathologic analysis.

The histopathologic examination helped confirm the diagnosis of osteoid osteoma due to osteoblastic cells proliferation elaborating calcified bone substance. Osteoblasts lacked any atypy and demonstrated no mitotic activity thus confirming the benignancy of the lesion. Postoperative follow-up was simple. Progressive return to normal walking activity was initiated the day after surgery with crutch support. A control CT-scan was performed on the 5th postoperative day, which confirmed successful complete excision of the tumor (Fig. 4). Two months after surgery, the patient had no complaints of pain. Range of motion was normal

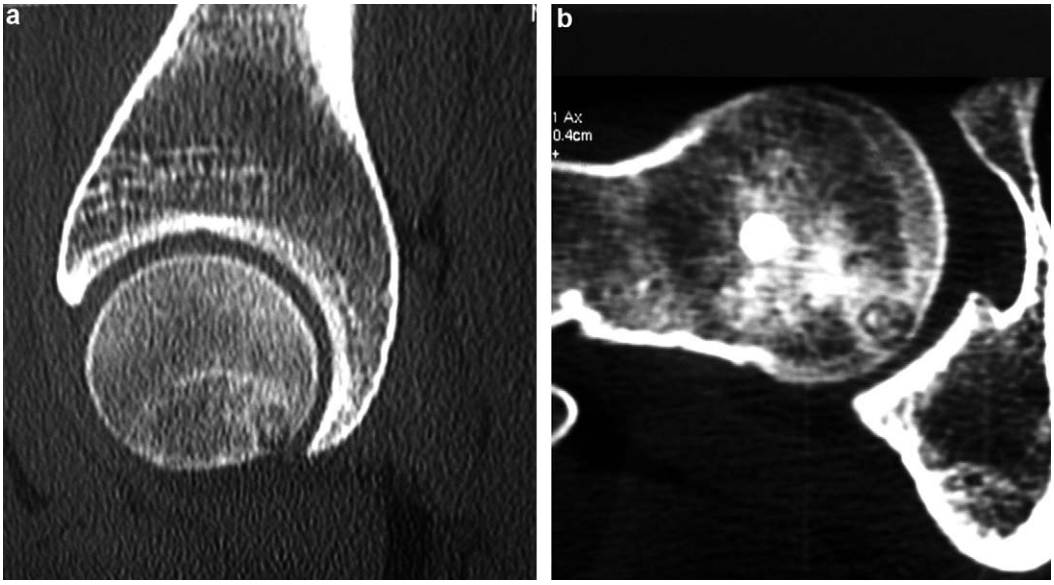

Figure 3 Preoperative sagittal (3a) and axial (3b) CT-scans of the right hip: typical radioluscent nidus surrounded by a dense sclerotic area with intra-articular tumor effraction.

and symmetrical. The patient had resumed his professional activities. At 5-year follow-up, the clinical examination was strictly normal and the patient had returned to its sporting activities with no complaints of pain.

A control CT-scan was obtained to assess the postoperative evolution and evaluate partial or complete infilling of the cavity. It revealed a secular aspect with partial infilling of the cavity through spontaneous bone growth (Fig. 5) with no sign of necrosis.

Discussion

Intra-articular osteoid osteoma accounts for approximately 10% of all osteoid osteomas and mainly arises in the elbow, the ankle or in the hip joints [6,7]. Diagnosis is challenging due to the rarity and non-specificity of its clinical presentation such as pain or even mono-arthritis [5,6,11,12]. Osteoid osteoma may be mistaken for other etiologies such as inflammatory or infectious arthritis, aseptic osteonecrosis of the femoral head, fatigue fracture, radicular syndrome or even pigmented villonodular synovitis [6—8,13]. Therefore, the mean delay between the onset of symptoms and diagnosis of intra-articular osteoma varies from 1.5 to 3.5 years [7,12,13]. The effect of anti-inflammatory drugs does not constitute a proof for diagnosis since they only demonstrate a lower efficiency in intra-articular osteoid osteomas [5]. Standard radiographs only provide subtle findings due to the absence of any perilesional sclerosis or periosteal reaction, unlike extra-articular locations [5]. According to some authors, MRI remains the modality of choice for bone tumor exploration [14—16]. On MR imaging, osteoid osteoma

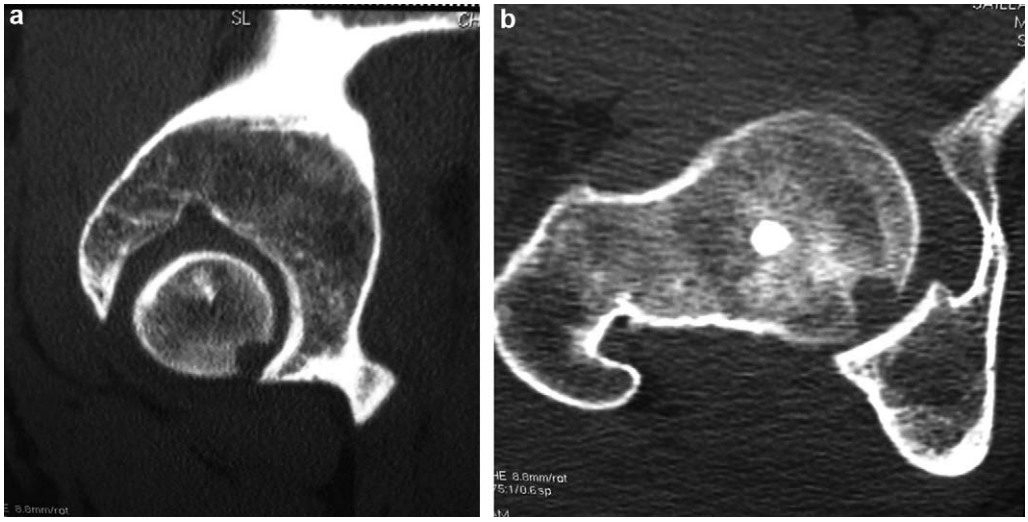

Figure 4 Sagittal (4a) and axial (4b) CT-scans of the right hip at five postoperative days: complete excision of the lesion.

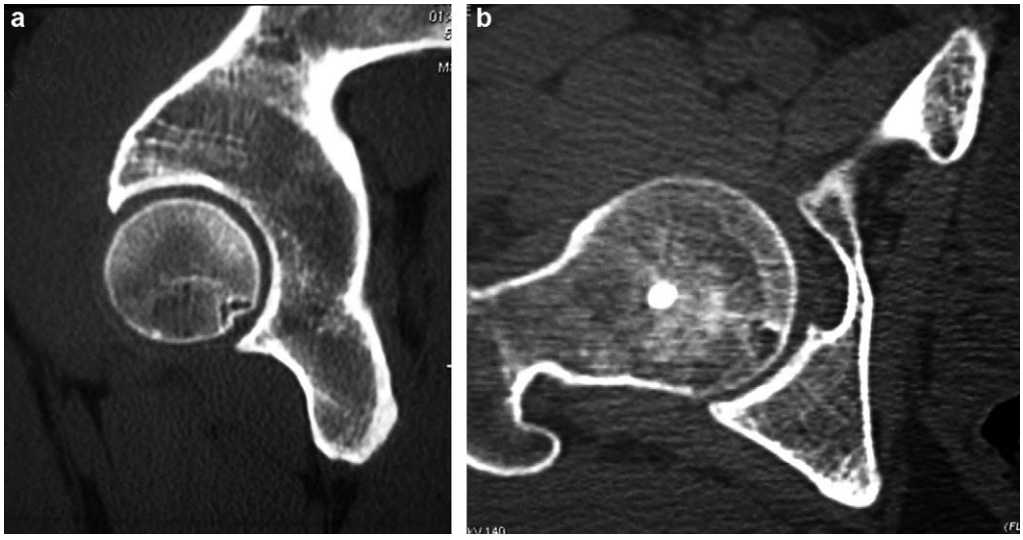

Figure 5 Sagittal (5a) and axial (5b) CT-scans of the right hip at five postoperative years: partial infilling of the cavity through spontaneous bone growth.

typically shows low signal intensity on T1 and T2-weighted images with bone marrow edema depicted around the nidus and high contrast enhancement after gadolinium administration. Intra-articular lesions may demonstrate synovial thickening apparent on MRIs, diagnosis being confirmed after gadolinium injection. However, precise localization of the nidus may not be easy. In 35% of the cases, the nidus cannot be detected since it is often hidden by the associated perilesional edema surrounding the lesion while in 50% of the cases, the nidus has an atypical presentation, which may lead to misdiagnosis [9]. In our case, MRI could not provide early diagnosis of osteoid osteoma due to the small size of the lesion and was even twice misleading with the presence of enostosis. Therefore, according to many authors, bone scintigraphy and CT-scanning are the initial examinations of choice for proper diagnosis [9,12,13]. Bone scintigraphy is highly sensitive but demonstrates a lower specificity than CT-scan particularly in case of intra-articular location because bone sclerosis around the nidus cannot be early detected since there is a less intense uptake due to the associated synovial reaction [17]. As osteoid osteoma evolves, signal intensity of peripheral bone sclerosis decreases while the nidus can be more easily detectable on scintigraphy as in our case where the nidus was identified 18 months after the onset of the symptoms. Computed tomography remains the examination of choice when using high-resolution contiguous millimetric thin slices thus providing accurate data regarding the size and location of the lesion [16,18].

Direct surgical approach is the reference treatment only in case of confused diagnosis prior to anatomopathologic examination or when tumor location does not provide easy access for radioguided techniques [4]. Despite their proven reliability and efficiency and the limited number of complications and recurrencies, minimally invasive techniques such as percutaneous surgery for drilling-resection procedure under CT-guidance [19,20], laser photocoagulation [21,22], radiofrequency coagulation [23,24] or even hip arthroscopy [25,26] could not be proposed. Due to the location of the osteoid osteoma adjacent to the femoral cartilage, the use of thermocoagulation, laser photocoagulation or even radiofrequency appeared challenging [10] while the posteroinferior location of the lesion did not provide a safe access for arthroscopic excision. Open surgical surgery thus appeared as the best management option and was performed through a limited posterior approach with dissection of the circumflex pedicle for preservation of cephalic vascularization [27] while providing sufficient exposure with no intraoperative referencing technique and allowing complete excision of the lesion which was later confirmed by histopathologic analysis and demonstrating no recurrence. Percutaneous techniques should be used in case of reliable diagnosis and easy access to the lesion with no associated iatrogenous risks. Otherwise, conventional surgery through the minimally invasive approach should be performed for efficient curative treatment with precise histopathologic examination.

Disclosure of interest

The authors declare that they have no conflicts of interest concerning this article.

References

[1] Jaffe HL. Osteoid osteoma. Arch Surg 1935;31:709—28.
[2] Jacopin S, Launay F, Viehweger E, Glard Y, Jouve JL, Bollini G. Hip subluxation and coxa valga secondary to an osteoid osteoma. Rev Chir Orthop 2008;94:758—62.
[3] Lee EH, Shafi M, Hui JH. Osteoid osteoma: a current review. J Pediatr Orthop 2006;26:695—700.
[4] Bonnevialle P, Railhac JJ. Ostéome ostéoide, ostéoblastome. Encycl Med Chir (Éditions scientifiques et médicales Elsevier SAS, Paris), Appareil locomoteur, 14-712, 2001, 7 p.
[5] Cassar-Pullicino VN, McCall IW, Wan S. Intra-articular osteoid osteoma. Clin Radiol 1992;45:153—60.
[6] Franceschi F, Marinozzi A, Papalia R, Longo UG, Gualdi G, Denaro E. Intra- and juxta-articular osteoid osteoma: a diagnostic challenge: misdiagnosis and successful treatment:

a report of four cases. Arch Orthop Trauma Surg 2006;126: 660—7.
[7] Szendroi M, Kollo K, Antal I, Lakatos J, Szoke G. Intra-articular osteoid osteoma: clinical features, imaging results, and comparison with extra-articular localization. J Rheumatol 2004;31:957—64.
[8] Kellner H, Spathling S, Kuffer G, Herzer P. Intra-articular osteoid osteoma: a rare cause of coxitis. Z Rheumatol 1991;50: 114—6.
[9] Davies M, Cassar-Pullicino VN, Davies AM. The diagnostic accuracy of MR imaging in osteoid osteoma. Skeletal Radiol 2002;31:559—69.
[10] Bosschaert PP, Deprez FC. Acetabular osteoid osteoma treated by percutaneous radiofrequency ablation: delayed articular cartilage damage. JBR-BRT 2010;93: 204—6.
[11] Corbett JM, Wilde AH, McCormack LJ, Evarts CM. Intra-articular osteoid osteoma; a diagnostic problem. Clin Orthop Relat Res 1974;98:225—30.
[12] Caillieret J, Fontaine C, Ducloux M, Letendart J, Duquennoy A. Osteoid osteoma of the upper extremity of the femur. Rev Chir Orthop 1986;72(2):101—3.
[13] Bauer TW, Zehr RJ, Belhobek GH, Marks KE. Juxta-articular osteoid osteoma. Am J Surg Pathol 1991;15:381—7.
[14] Spouge AR, Thain LM. Osteoid osteoma: MR imaging revisited. Clin Imaging 2000;24:19—27.
[15] Barbiera F, Bartolotta TV, Lo Casto A, Pardo S, Rossello M, De Maria M. Intra-articular osteoid osteoma: diagnostic imaging in three cases. Radiol Med 2002;103:464—73.
[16] Allen SD, Saifuddin A. Imaging of intra-articular osteoid osteoma. Clin Radiol 2003;58:845—52.
[17] Koliakos G, Katsiki N. Osteoid osteoma mimicking chronic arthritis. Diagnosis by bone scintigraphy. Hell J Nucl Med 2005;8:171—3.
[18] Aisen AM, Glazer GM. Diagnosis of osteoid osteoma using computed tomography. J Comput Tomogr 1984;8:175—8.
[19] Guyot-Drouot MH, Migaud H, Cotten A, Cortet B, Delezenne A, Chastanet P, et al. Long-term efficacy of percutaneous drill-biopsy under computed tomography guidance of osteoid osteomas of the hip and femur. A review of seven cases. Joint Bone Spine 2000;67:204—9.
[20] Kohler R, Rubini J, Postec F, Canterino I, Archimbaud F. Treatment of osteoid osteoma by CT-controlled percutaneous drill resection. A propos of 27 cases. Rev Chir Orthop 1995;81:317—25.
[21] Gangi A, Dietemann JL, Gasser B, Mortazavi R, Brunner P, Mourou RY, et al. Interstitial laser photocoagulation of osteoid osteomas with use of CT-guidance. Radiology 1997;203:843—8.
[22] Gangi A, Dietemann JL, Clavert JM, Dodelin A, Mortazavi R, Durckel J, et al. Treatment of osteoid osteoma using laser photocoagulation. A propos of 28 cases. Rev Chir Orthop 1998;84:676—84.
[23] Ghanem I, Collet LM, Kharrat K, Samaha A, Deramon H, Mertl P. Percutaneous radiofrequency coagulation of osteoid osteoma in children and adolescents. J Pediatr Orthop 2003;12:244—52.
[24] Rosenthal DI, Hernick FJ, Wolfe MW, Jennings C, Gebhardt MC, Mankin HJ. Percutaneous radiofrequency coagulation of osteoid osteoma compared with operative treatment. J Bone Joint Surg (Am) 1998;80:815—21.
[25] Khapchik V, O'Donnell RJ, Glick JM. Arthroscopically assisted excision of osteoid osteoma involving the hip. Arthroscopy 2001;17:56—61.
[26] Lee DH, Jeong WK, Lee SH. Arthroscopic excision of osteoid osteomas of the hip in children. J Pediatr Orthop 2009;29:547—51.
[27] Goldstein WM, Branson JJ, Berland KA, Gordon AC. Minimal-incision for total hip arthroplasty. J Bone Joint Surg (Am) 2003;85(4):33—8.